# WEST Search History

DATE: Tuesday, August 05, 2003

| Set Name side by side | Query | Hit Count | Set Name result set |
|---|---|---|---|
| | *DB=USPT,PGPB,JPAB,EPAB,DWPI; THES=ASSIGNEE; PLUR=YES; OP=ADJ* | | |
| L2 | l1 and (desired activity or improved activity or desired properties) | 23 | L2 |
| L1 | (enzyme or glycosidase) and (nucleic acid or dna) and (varigat$5 or muta$6) and (mixed population of organisms or environmental sample) | 563 | L1 |

END OF SEARCH HISTORY

WEST

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**Search Results** - Record(s) 1 through 20 of 23 returned.

☐ 1. Document ID: US 20030134349 A1

L2: Entry 1 of 23 File: PGPB Jul 17, 2003

PGPUB-DOCUMENT-NUMBER: 20030134349
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030134349 A1

TITLE: Enzymes for the detection of nucleic acid sequences

PUBLICATION-DATE: July 17, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Ma, Wu-Po | Madison | WI | US | |
| Lyamichev, Victor I. | Madison | WI | US | |
| Kaiser, Michael W. | Madison | WI | US | |
| Lyamicheva, Natalie E. | Madison | WI | US | |
| Allawi, Hatim Taysir | Madison | WI | US | |
| Schaefer, James J. | Madison | WI | US | |
| Neri, Bruce P. | Madison | WI | US | |

US-CL-CURRENT: 435/69.1; 435/199, 435/320.1, 435/325, 435/6, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

☐ 2. Document ID: US 20030104378 A1

L2: Entry 2 of 23 File: PGPB Jun 5, 2003

PGPUB-DOCUMENT-NUMBER: 20030104378
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030104378 A1

TITLE: Detection of RNA

PUBLICATION-DATE: June 5, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Allawi, Hatim | Madison | WI | US | |
| Bartholomay, Christian Tor | Madison | WI | US | |
| Chehak, LuAnne | Janesville | WI | US | |
| Curtis, Michelle L. | Cottage Grove | WI | US | |
| Eis, Peggy S. | Madison | WI | US | |
| Hall, Jeff G. | Madison | WI | US | |
| Ip, Hon S. | Madison | WI | US | |
| Kaiser, Michael | Madison | WI | US | |
| Kwiatkowski, Robert W. JR. | Verona | WI | US | |
| Lukowiak, Andrew A. | Madison | WI | US | |
| Lyamichev, Victor | Madison | WI | US | |
| Ma, WuPo | Madison | WI | US | |
| Olson-Munoz, Marilyn C. | Madison | WI | US | |
| Olson, Sarah M. | Cross Plains | WI | US | |
| Schaefer, James J. | Madison | WI | US | |
| Skrzypczynski, Zbigniew | Verona | WI | US | |
| Takova, Tsetska Y. | Madison | WI | US | |
| Vedvik, Kevin L. | Madison | WI | US | |
| Lyamichev, Natalie | Madison | WI | US | |
| Neri, Burce P. | Madison | WI | US | |

US-CL-CURRENT: 435/6; 435/91.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

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☐ 3. Document ID: US 20030097684 A1

L2: Entry 3 of 23 File: PGPB May 22, 2003

PGPUB-DOCUMENT-NUMBER: 20030097684
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030097684 A1

TITLE: Lipid acyl hydrolases and variants thereof

PUBLICATION-DATE: May 22, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Carr, Brian | Raleigh | NC | US | |
| Rosen, Barbara A. | Mountain View | CA | US | |
| Bermudez, Ericka R. | Aptos | CA | US | |
| Ness, Jon E. | Redwood City | CA | US | |

US-CL-CURRENT: 800/281; 435/198, 435/410, 435/69.1, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 4. Document ID: US 20030083480 A1

L2: Entry 4 of 23 File: PGPB May 1, 2003

PGPUB-DOCUMENT-NUMBER: 20030083480
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030083480 A1

TITLE: Novel glyphosate N-acetyl transferase (GAT) genes

PUBLICATION-DATE: May 1, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Castle, Linda A. | Mountain View | CA | US | |
| Siehl, Dan | Menlow Park | CA | US | |
| Giver, Lorraine J. | Santa Clara | CA | US | |
| Minshull, Jeremy | Menlo Park | CA | US | |
| Ivy, Cristina | Los Altos | CA | US | |
| Chen, Yong Hong | Foster City | CA | US | |
| Duck, Nicholas B. | Apex | NC | US | |

US-CL-CURRENT: 536/23.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 5. Document ID: US 20030049648 A1

L2: Entry 5 of 23 File: PGPB Mar 13, 2003

PGPUB-DOCUMENT-NUMBER: 20030049648
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030049648 A1

TITLE: 37 staphylococcus aureus genes and polypeptides

PUBLICATION-DATE: March 13, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Choi, Gil H. | Rockville | MD | US | |

US-CL-CURRENT: 435/6; 435/220, 435/252.3, 435/320.1, 435/69.1, 435/7.32, 536/23.7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 6. Document ID: US 20030036116 A1

L2: Entry 6 of 23 File: PGPB Feb 20, 2003

PGPUB-DOCUMENT-NUMBER: 20030036116
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030036116 A1

TITLE: Exonuclease-mediated nucleic acid reassembly in directed evolution

PUBLICATION-DATE: February 20, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Short, Jay M. | Rancho Santa Fe | CA | US | |

US-CL-CURRENT: 435/69.1; 530/350, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

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☐ 7. Document ID: US 20020146762 A1

L2: Entry 7 of 23 File: PGPB Oct 10, 2002

PGPUB-DOCUMENT-NUMBER: 20020146762
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020146762 A1

TITLE: End selection in directed evolution

PUBLICATION-DATE: October 10, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Short, Jay M. | Rancho Santa Fe | CA | US | |
| Frey, Gerhard Johann | San Diego | CA | US | |

US-CL-CURRENT: 435/69.1; 435/440, 435/5, 435/69.7, 435/7.6, 530/350, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

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☐ 8. Document ID: US 20020142394 A1

L2: Entry 8 of 23 File: PGPB Oct 3, 2002

PGPUB-DOCUMENT-NUMBER: 20020142394
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020142394 A1

TITLE: Exonuclease-mediated gene assembly in directed evolution

PUBLICATION-DATE: October 3, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Short, Jay M. | Rancho Santa Fe | CA | US | |

US-CL-CURRENT: 435/69.1; 530/350, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw. Desc | Image

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☐ 9. Document ID: US 20020137153 A1

L2: Entry 9 of 23 File: PGPB Sep 26, 2002

PGPUB-DOCUMENT-NUMBER: 20020137153
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020137153 A1

TITLE: Enantioselective production of amino carboxylic acids

PUBLICATION-DATE: September 26, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Ramer, Sandra W. | Sunnyvale | CA | US | |
| Huisman, Gjalt | San Carlos | CA | US | |
| Millis, Jim | Kohler | WI | US | |
| Sheldon, Roger | Rijswijk | CA | NL | |
| delCardayre, Stephen | Belmont | CA | US | |
| Tobin, Matthew | San Jose | CA | US | |
| Cox, Anthony | Mountain View | CA | US | |
| Davis, S. Christopher | San Francisco | | US | |

US-CL-CURRENT: 435/129; 435/227

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 10. Document ID: US 20020127623 A1

L2: Entry 10 of 23 File: PGPB Sep 12, 2002

PGPUB-DOCUMENT-NUMBER: 20020127623
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020127623 A1

TITLE: Biosensors, reagents and diagnostic applications of directed evolution

PUBLICATION-DATE: September 12, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Minshull, Jeremy | Menlo Park | CA | US | |
| Davis, S. Christopher | San Francisco | CA | US | |
| Welch, Mark | Fremont | CA | US | |
| Raillard, Sun Ai | Mountain View | CA | US | |
| Vogel, Kurt | Palo Alto | CA | US | |
| Krebber, Claus | Mountain View | CA | US | |

US-CL-CURRENT: 435/7.92; 435/7.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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☐ 11. Document ID: US 20020119457 A1

L2: Entry 11 of 23 File: PGPB Aug 29, 2002

PGPUB-DOCUMENT-NUMBER: 20020119457
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020119457 A1

TITLE: End selection in directed evolution

PUBLICATION-DATE: August 29, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Short, Jay M. | Rancho Santa Fe | CA | US | |
| Frey, Gerhard Johann | San Diego | CA | US | |

US-CL-CURRENT: 435/6; 435/69.1, 530/350, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

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☐ 12. Document ID: US 20020103338 A1

L2: Entry 12 of 23 File: PGPB Aug 1, 2002

PGPUB-DOCUMENT-NUMBER: 20020103338
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020103338 A1

TITLE: Staphylococcus aureus polynucleotides and polypeptides

PUBLICATION-DATE: August 1, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Choi, Gil H. | Rockville | MD | US | |

US-CL-CURRENT: 530/350; 435/252.3, 435/320.1, 435/325, 435/69.1, 536/23.7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

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☐ 13. Document ID: US 20020081665 A1

L2: Entry 13 of 23 File: PGPB Jun 27, 2002

PGPUB-DOCUMENT-NUMBER: 20020081665
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020081665 A1

TITLE: Bryostatins, bryopyrans and polyketides: compositions and methods

PUBLICATION-DATE: June 27, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Haygood, Margo | La Jolla | CA | US | |
| Davidson, Seana K. | La Jolla | CA | US | |
| Allen, Scott W. | San Diego | CA | US | |
| Hildebrand, Mark | La Jolla | CA | US | |

US-CL-CURRENT: 435/76; 435/252.3, 435/6, 514/27, 514/28, 536/23.2, 536/7.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 14. Document ID: US 20020042055 A1

L2: Entry 14 of 23 File: PGPB Apr 11, 2002

PGPUB-DOCUMENT-NUMBER: 20020042055
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020042055 A1

TITLE: Alteration of hydrolase genes and screening of the resulting libraries for the ability to catalyze specific reactions

PUBLICATION-DATE: April 11, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Affholter, Joseph A. | Zephyr Cove | NV | US | |

US-CL-CURRENT: 435/6; 435/7.1, 435/91.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 15. Document ID: US 6562594 B1

L2: Entry 15 of 23 File: USPT May 13, 2003

US-PAT-NO: 6562594
DOCUMENT-IDENTIFIER: US 6562594 B1

TITLE: Saturation mutagenesis in directed evolution

DATE-ISSUED: May 13, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Short; Jay M. | Rancho Santa Fe | CA | | |

US-CL-CURRENT: 435/69.1; 435/69.7, 435/7.6, 530/350

ABSTRACT:

Disclosed is a rapid and facilitated method of producing from a parentlal template polynucleotide, a set of mutagenized progeny polynculeotides whereby at each original codon position there is produced at least one substitute codon encoding each of the 20 naturally encoded amino acids. Accordingly, there is also provided a method of producing from a parental template polypeptide, a set of mutagenized progeny

polypeptides wherein each of the 20 naturally encoded amino acids is represented at each original amino acid position. The method provided is termed site-saturation mutagenesis, or simply saturation mutagenesis, and can be used in combination with other mutagenization processes, such as, for example, a process wherein two or more related polynucleotides are introduced into a suitable host cell such that a hybrid polynucleotide is generated by recombination and reductive reassortment. Also provided are vector and expression vehicles incuding such polynucleotides, polypeptides expressed by the hybrid polynucleotides and a method for screening for hybrid polypeptides.

6 Claims, 2 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 2



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☐ 16. Document ID: US 6537776 B1

L2: Entry 16 of 23 File: USPT Mar 25, 2003

US-PAT-NO: 6537776
DOCUMENT-IDENTIFIER: US 6537776 B1

TITLE: Synthetic ligation reassembly in directed evolution

DATE-ISSUED: March 25, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Short; Jay M. | Encinitas | CA | | |

US-CL-CURRENT: 435/69.1; 530/350, 536/23.2

ABSTRACT:

Harvesting the full richness of biodiversity is instantly recognized by Diversa Corporation as a powerful means to access both novel molecules having direct commercial utility as well as molecular templates that could be retooled to acquire commercial utility. A directed evolution process for rapid and facilitated production from a progenitor polynucleotide template, of a library of mutagenized progeny polynucleotides wherein each of the 20 naturally encoded amino acids is encoded at each original codon position. This method, termed site-saturation mutagenesis, or simply saturation mutagenesis, is preferably based on the use of the degenerate N,N,G/T sequence. Also, a method of non-stochastically producing a library of chimeric nucleic acid molecules having an overall assembly order that is chosen by design. Accordingly, a set of progenitor templates, such as genes (e.g. a family of esterase genes) or genes pathways (e.g. encoding antibiotics) can be shuffled to generate a sizable library of distinct progeny polynucleotide molecules (e.g. 10.sup.100) and correspondingly encoded polypeptides. Screening of these polynucleotide libraries enables the identification of a desirable molecular species that has a desirable property, such as a specific enzymatic activity serviceable for a commercial application, or a novel antibiotic. Also, a method of retooling genes and gene pathways by the introduction of regulatory sequences, such as promoters, that are operable in an intended host, thus conferring operability to a novel gene pathway when it is introduced into an intended host. For example a novel man-made gene pathway, generated based on microbially-derived progenitor templates, that is operable in a plant cell.

15 Claims, 20 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 18

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 17. Document ID: US 6521441 B1

L2: Entry 17 of 23 File: USPT Feb 18, 2003

US-PAT-NO: 6521441
DOCUMENT-IDENTIFIER: US 6521441 B1

TITLE: Staphylococcus aureus genes and polypeptides

DATE-ISSUED: February 18, 2003

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Simpson; Andrew J. G. | Sao Paulo | | | BR |
| Choi; Gil H. | Rockville | MD | | |

US-CL-CURRENT: 435/252.3; 435/320.1, 435/325, 536/23.7

ABSTRACT:

The present invention relates to 11 novel genes from S. aureus and the polypeptides they encode. Also provided are vectors, host cells, antibodies and recombinant methods for producing the same. The invention further relates to screening methods for identifying agonists and antagonists of S. aureus polypeptide activity. The invention additionally relates to diagnostic methods for detecting Staphylococcus nucleic acids, polypeptides and antibodies in a biological sample. The present invention further relates to novel vaccines for the prevention or attenuation of infection by Staphylococcus.

21 Claims, 0 Drawing figures
Exemplary Claim Number: 1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 18. Document ID: US 6479258 B1

L2: Entry 18 of 23 File: USPT Nov 12, 2002

US-PAT-NO: 6479258
DOCUMENT-IDENTIFIER: US 6479258 B1

TITLE: Non-stochastic generation of genetic vaccines

DATE-ISSUED: November 12, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Short; Jay M. | Rancho Santa Fe | CA | | |

US-CL-CURRENT: 435/69.1; 530/350, 536/23.2

ABSTRACT:

This invention provides methods of obtaining vaccines by use of non-stochastic methods of directed evolution (DirectEvolution.TM.). These methods include non-stochastic polynucleotide site-satuaration mutagenesis (Gene Site Saturation Mutagenesis.TM.) and non-stochastic polynucleotide reassembly (GeneReassembly.TM.). Through use of the claimed methods, vectors can be obtained which exhibit increased efficacy for use as genetic vaccines. Vectors obtained by using the methods can have, for example, enhanced antigen expression, increased uptake into a cell, increased stability in a cell, ability to tailor an immune response, and the like.

86 Claims, 66 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 61



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☐ 19. Document ID: US 6361974 B1

L2: Entry 19 of 23 File: USPT Mar 26, 2002

US-PAT-NO: 6361974
DOCUMENT-IDENTIFIER: US 6361974 B1
**** See image for Certificate of Correction ****

TITLE: Exonuclease-mediated nucleic acid reassembly in directed evolution

DATE-ISSUED: March 26, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Short; Jay M. | Rancho Santa Fe | CA | | |
| Djavakhishvili; Tsotne David | San Diego | CA | | |
| Frey; Gerhard Johann | San Diego | CA | | |

US-CL-CURRENT: 435/69.1; 530/350, 536/23.2

ABSTRACT:

This invention provides methods of obtaining novel polynucleotides and encoded polypeptides by the use of non-stochastic methods of directed evolution (DirectEvolution.TM.). A particular advantage of exonuclease-mediated reassembly methods is the ability to reassemble nucleic acid strands that would otherwise be problematic to chimerize. Exonuclease-mediated reassembly methods can be used in combination with other mutagenesis methods provided herein. These methods include non-stochastic polynucleotide site-saturation mutagenesis (Gene Site Saturation Mutagenesis.TM.) and non-stochastic polynucleotide reassembly (GeneReassembly.TM.). This invention provides methods of obtaining novel enzymes that have optimized physical &/or biological properties. Through use of the claimed methods, genetic vaccines, enzymes, small molecules, and other desirable molecules can be evolved towards desirable properties. For example, vaccine vectors can be obtained that exhibit increased efficacy for use as genetic vaccines. Vectors obtained by using the methods can have, for example, enhanced antigen expression, increased uptake into a cell, increased stability in a cell, ability to tailor an immune response, and the like. Furthermore, this invention provides methods of obtaining a variety of novel biologically active molecules, in the fields of antibiotics, pharmacotherapeutics, and transgenic traits.

15 Claims, 6 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 6

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 20. Document ID: US 6358709 B1

L2: Entry 20 of 23 File: USPT Mar 19, 2002

US-PAT-NO: 6358709
DOCUMENT-IDENTIFIER: US 6358709 B1

TITLE: End selection in directed evolution

DATE-ISSUED: March 19, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Short; Jay M. | Encinitas | CA | | |
| Frey; Gerhard Johann | San Diego | CA | | |

US-CL-CURRENT: 435/69.1; 530/350, 536/23.2

ABSTRACT:

This invention provides methods of obtaining novel polynucleotides and encoded polypeptides by the use of non-stochastic methods of directed evolution (DirectEvolution.TM.). A particular advantage of end-selection-based methods is the ability to recover full-length polynucleotides from a library of progeny molecules generated by mutagenesis methods. These methods include non-stochastic polynucleotide site-saturation mutagenesis (Gene Site Saturation Mutagenesis.TM.) and non-stochastic polynucleotide reassembly (GeneReassembly.TM.). This invention provides methods of obtaining novel enzymes that have optimized physical &/or biological properties. Through use of the claimed methods, genetic vaccines, enzymes, small molecules, and other desirable molecules can be evolved towards desirable properties. For example, vaccine vectors can be obtained that exhibit increased efficacy for use as genetic vaccines. Vectors obtained by using the methods can have, for example, enhanced antigen expression, increased uptake into a cell, increased stability in a cell, ability to tailor an immune response, and the like. Furthermore, this invention provides methods of obtaining a variety of novel biologically active molecules, in the fields of antibiotics, pharmacotherapeutics, and transgenic traits.

36 Claims, 11 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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| Terms | Documents |
|---|---|
| l1 and (desired activity or improved activity or desired properties) | 23 |

**Display Format:** - Change Format

WEST

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**Search Results** - Record(s) 21 through 23 of 23 returned.

☐ 21. Document ID: US 6352842 B1

L2: Entry 21 of 23 File: USPT Mar 5, 2002

US-PAT-NO: 6352842
DOCUMENT-IDENTIFIER: US 6352842 B1
**** See image for Certificate of Correction ****

TITLE: Exonuclease-mediated gene assembly in directed evolution

DATE-ISSUED: March 5, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Short; Jay M. | Encinitas | CA | | |
| Frey; Gerhard J. | San Diego | CA | | |
| Djavakhishvili; Tsotne D. | San Diego | CA | | |

US-CL-CURRENT: 435/69.1; 530/350, 536/23.2

ABSTRACT:

A directed evolution process comprising novel methods for generating improved progeny molecules having desirable properties, including, for example, a method for rapid and facilitated production from a parental polynucleotide template, of a set of mutagenized progeny polynucleotides wherein at least one codon encoding each of the 20 naturally encoded amino acids is represented at each original codon position. This method, termed site-saturation mutagenesis, or simply saturation mutagenesis, is preferably based on the use of the degenerate N,N,G/T sequence. Also, a method of producing from a parental polypeptide template, a set of mutagenized progeny polypeptides wherein each of the 20 naturally encoded amino acids is represented at each original amino acid position. Also, other mutagenization processes that can be used in combination with, or in lieu of, saturation mutagenesis, including, for example: (a) assembly and/or reassembly of polynucloetide building blocks (including sections of genes &/or of gene families) mediated by a source of exonuclease activity such as exonuclease III; and (b) introduction of two or more related polynucleotides into a suitable host cell such that a hybrid polynucleotide is generated by recombination and reductive reassortment. Also molecular property screening methods, including a preferred method, termed end selection, comprised of using an enzyme, such as a topoisomerase, a restriction endonuclease, &/or a nicking enzyme (such as N. BstNB I), to detect a specific terminal sequence in a working polynucleotide, to produce a ligatable end thereat, and to ligate and clone the working polynucleotide.

20 Claims, 1 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Drawn Desc | Image

☐ 22. Document ID: US 6238884 B1

L2: Entry 22 of 23 File: USPT May 29, 2001

US-PAT-NO: 6238884
DOCUMENT-IDENTIFIER: US 6238884 B1

TITLE: End selection in directed evolution

DATE-ISSUED: May 29, 2001

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Short; Jay M. | Encinitas | CA | | |
| Frey; Gerhard Johann | San Diego | CA | | |

US-CL-CURRENT: 435/69.1; 530/350, 536/23.2

ABSTRACT:

A directed evolution process comprising novel methods for generating improved progeny molecules having desirable properties, including, for example, a method for rapid and facilitated production from a parental polynucleotide template, of a set of mutagenized progeny polynucleotides wherein at least one codon encoding each of the 20 naturally encoded amino acids is represented at each original codon position. This method, termed site-saturation mutagenesis, or simply saturation mutagenesis, is preferably based on the use of the degenerate N,N,G/T sequence. Also, a method of producing from a parental polypeptide template, a set of mutagenized progeny polypeptides wherein each of the 20 naturally encoded amino acids is represented at each original amino acid position. Also, other mutagenization processes that can be used in combination with, or in lieu of, saturation mutagenesis, including, for example: (a) assembly and/or reassembly of polynucloetide building blocks, which building blocks can be sections of genes &/or of gene families; and (b) introduction of two or more related polynucleotides into a suitable host cell such that a hybrid polynucleotide is generated by recombination and reductive reassortment. Also, vector and expression vehicles including such polynucleotides and correspondingly expressed polypeptides. Also molecular property screening methods, including a preferred method, termed end selection, comprised of using an enzyme, such as a topoisomerase, a restriction endonuclease, &/or a nicking enzyme (such as N. BstNB I), to detect a specific terminal sequence in a working polynucleotide, to produce a ligatable end thereat, and to ligate and clone the working polynucleotide.

21 Claims, 9 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 5

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 23. Document ID: US 6171820 B1

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TITLE: Saturation mutagenesis in directed evolution

DATE-ISSUED: January 9, 2001

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Short; Jay M. | Encinitas | CA | | |

US-CL-CURRENT: 435/69.1; 435/69.7, 435/7.6, 530/350

ABSTRACT:

Disclosed is a rapid and facilitated method of producing from a parental template polynucleotide, a set of mutagenized progeny polynucleotides whereby at each original codon position there is produced at least one substitute codon encoding each of the 20 naturally encoded amino acids. Accordingly, there is also provided a method of producing from a parental template polypeptide, a set of mutagenized progeny polypeptides wherein each of the 20 naturally encoded amino acids is represented at each original amino acid position. The method provided is termed site-saturation mutagenesis, or simply saturation mutagenesis, and can be used in combination with other mutagenization processes, such as, for example, a process wherein two or more related polynucleotides are introduced into a suitable host cell such that a hybrid polynucleotide is generated by recombination and reductive reassortment. Also provided are vector and expression vehicles including such polynucleotides, polypeptides expressed by the hybrid polynucleotides and a method for screening for hybrid polypeptides.

13 Claims, 2 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 2